



Biology and Applications of Type III CRISPR-Cas systems

Tina Liu, Ph.D.

Rutgers University

**Assistant Professor, Department of Molecular
Biology & Biochemistry | Center for Advanced
Biotechnology & Medicine**



Abstract: CRISPR-Cas systems are RNA-guided adaptive immune pathways that protect bacteria and archaea from mobile genetic elements. While DNA-targeting CRISPR systems are well studied and widely used for genome editing, less is understood about the biology and potential applications of RNA-targeting CRISPR systems. In this study, I will focus on Type III CRISPR, an RNA-targeting system that belongs to the most abundant class of CRISPR-Cas systems in nature. Type III CRISPR systems use a complex and unique mechanism of immunity, in which recognition of foreign RNA by a ribonucleoprotein complex triggers single-stranded DNA and RNA degradation, as well as synthesis of second messenger molecules. The second messenger, which is commonly a cyclic oligoadenylate, can bind to and activate a diverse array of signaling effector proteins to amplify the immune response. In this talk, I will present our work on understanding the mechanism of CRISPR-associated signaling nucleases and their applications in RNA detection and diagnostics.

Wednesday, November 19th | 2:00pm-3:15pm | Science Hall 126

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